

WHAT IS CLAIMED IS:

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- 1 1. A method of testing a mass consisting at least
- 2 primarily of a first material for the presence of at
- 3 least one second material, comprising the steps of:
- 4       establishing and maintaining a microwave field;
- 5       introducing the mass into the range of the micro-
- 6 wave field so that the field is influenced by the mass;
- 7       and
- 8       analyzing the influence of the mass upon the micro-
- 9 wave field, including:
- 10           simultaneously measuring the actual values
- 11 of a first and a second characteristic of the mi-
- 12 crowave field,
- 13           selecting an acceptable value range for the
- 14 actual values,
- 15           ascertaining whether the actual values are
- 16 within the acceptable range, and
- 17           generating signals when the actual values are
- 18 outside of the acceptable range.

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1 2. The method of claim 1, wherein the acceptable  
2 range encompasses measured values of first and second  
3 characteristics of the microwave field when the field  
4 is influenced by a mass containing only the first mate-  
5 rial.

1 3. The method of claim 1, wherein the actual values are  
2 outside of the acceptable value range, to thus initiate  
3 the generation of signals, when the mass being introduced  
4 into the range of the microwave field contains the at  
5 least one second material.

1 4. The method of claim 1, wherein the mass  
2 includes a stream and said introducing step includes  
3 moving the stream through the microwave field.

1 5. The method of claim 1, wherein the mass  
2 consists at least of the first material, of a wrapper  
3 for the first material, and potentially of at least some  
4 second material randomly distributed in the first mate-  
5 rial.

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1 6. The method of claim 1, wherein the first mate-  
2 rial is a material of the tobacco processing industry.

1 7. The method of claim 6, wherein the first  
2 material is a smokable material.

1 8. The method of claim 6, wherein the first  
2 material is filter material for tobacco smoke.

1 9. The method of claim 1, further comprising the  
2 steps of:  
3 conveying the mass through the microwave field  
4 along a predetermined path;  
5 subdividing the mass in said path into a plurality  
6 of sections; and  
7 utilizing said signals to segregate from said path  
8 those sections of the mass the introduction of which into  
9 the range of the microwave field resulted in the  
10 generation of signals.

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1 10. The method of claim 1, wherein said  
2 introducing step includes imparting to the mass the shape  
3 of a stream and conveying the steam in a predetermined  
4 direction along a path extending through the microwave  
5 field, confining the stream in a wrapping material  
6 upstream of the microwave field, as seen in said direc-  
7 tion, and subdividing the wrapping material and the first  
8 material therein into a succession of discrete sections,  
9 and further comprising the step of utilizing said signals  
10 to remove from said path discrete sections containing  
11 said second material.

1 11. The method of claim 10, wherein each discrete  
2 section includes a rod-shaped smokers' product.

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1 12. The method of claim 1, wherein said step of  
2 selecting an acceptable value range for the actual values  
3 includes introducing into the microwave field a sample  
4 mass which is devoid of the at least one second material,  
5 examining the sample mass while within the microwave  
6 field, and utilizing the examining step to select said  
7 acceptable value range.

1 13. The method of claim 12, wherein the sample  
2 mass contains a tubular envelope.

1 14. The method of claim 1, further comprising the  
2 step of utilizing said actual values of said first and  
3 second characteristics of the microwave field for a  
4 determination of a characteristic of the mass other than  
5 potential presence of at least one second material.

1 15. The method of claim 14, wherein the first ma-  
2 terial contains tobacco and said characteristic other  
3 than the potential presence of at least one second mate-  
4 rial includes at least one of the density and moisture  
5 content of tobacco.

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1 16. Apparatus for testing a mass consisting at  
2 least primarily of a first material for the presence of  
3 impurities, comprising:

4 means for establishing and maintaining a microwave  
5 field;

6 means for moving at least one of the mass and the  
7 microwave field relative to the other so that the field  
8 is influenced by the mass; and

9 means for analyzing the influence of the mass upon  
10 the field, including:

11 means for simultaneously measuring the actual  
12 values of first and second characteristics of the  
13 field,

14 means for selecting an acceptable value range  
15 for the actual values,

16 means for ascertaining whether the actual  
17 values are within the acceptable range, and

18 means for generating signals when the actual  
19 values are outside of the acceptable range as a re-  
20 sult of the influence of impurities upon the micro-  
21 wave field.

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1 17. The apparatus of claim 16, wherein said moving  
2 means includes means for moving an elongated flow of mass  
3 along an elongated path including a portion extending  
4 through the microwave field.

1 18. The method of claim 16, further comprising  
2 means for segregating, in response to said signals, from  
3 the mass portions containing at least one impurity.

1 19. The apparatus of claim 16, wherein the first  
2 material is a material of the tobacco processing industry.

1 20. The apparatus of claim 16, further comprising  
2 means for processing said actual values for the determi-  
3 nation of at least one characteristic of first material  
4 other than the presence or absence of impurities.